



DEPARTMENT OF NATURAL RESOURCES

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MEMORANDUM

DATE: April 27, 2005

TO: Air Pollution Control Program Staff

FROM: Leanne Tippet Mosby, Director
(original signed by Leanne Tippet Mosby)
Air Pollution Control Program

SUBJECT: Retention Factors for Non-Heatset and Heatset Web Offset
Lithographic Printing Inks for Actual and Potential Emissions
Calculations

Considerable discussion has been ongoing concerning the calculation of emissions from web offset lithographic printing operations. Inconsistencies are found across the State of Missouri; but more troubling is the disparity between the State of Missouri and other states nationwide. These differences in calculation methodology are of concern to the Air Pollution Control Program since the results imply that a competitive advantage may exist relative to neighboring states.

Historically, the Air Pollution Control Program has viewed the difference in methods used to calculate Potential to Emit (PTE) for permitting purposes and those used to calculate actual emissions for emissions inventory purposes as necessary. Assumption of the temporary nature of retention of ink oils in the substrate has been the basis for the Air Pollution Control Program's separate consideration of potential and actual emissions. Although actual emissions calculations for non-heatset offset lithographic printing inks have included the use of a 95% ink oil retention factor, PTE calculations have assumed that all of the volatile organic compounds contained in the inks are emitted to the ambient air.



Retention Factors

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In the absence of source testing of emissions, the most conservative approach to calculate potential emissions is to assume 100% of the volatile organic compounds are emitted. In the past, both actual and potential emissions calculations have assumed no retention for heatset offset lithographic printing inks.

Industry representatives over the past ten years have submitted for review results from several studies concerning ink retention. The Air Pollution Control Program staff does not find the information submitted provides a scientifically defensible basis for setting an ink retention factor. Citations of retention percentages are found throughout industry and within Environmental Protection Agency (EPA) guidance. Claims of heatset ink oil retention range from 11% to 60%, while claims of 100% retention of non-heatset inks exist. For example, the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, cites an unpublished EPA document, a telephone conversation and a paper by R.R. Gadomski of the National Air Pollution Control Administration, *Evaluations of Emissions and Control Technologies in the Graphics Arts Industries, Phase I, Final Report* as the sources for retention factors contained therein. Review of the Gadomski paper reveals that the 40% retention factor for heatset inks and 100% retention for non-heatset inks are, as stated by Gadomski, "...estimates only, based on extremely limited analytical studies."

Despite this fact, the Air Pollution Control Program is revising the calculation methodologies to calculate PTE for permitting purposes and actual emissions reported in an installation's Emissions Inventory Questionnaire (EIQ) for lithographic printing. Industry requested this revision. The program is agreeing to this revision in order to increase consistency with respect to the majority of other states. Also, based on technical knowledge and staff experience, concession to the requested 20% retention factor for heatset offset lithographic printing inks and 95% for non-heatset offset lithographic printing inks is expected to have little or no impact on ambient air. In the future, should evidence show that there is a negative impact to the ambient air, the Air Pollution Control Program will revisit this policy position.

The Air Pollution Control Program will review applications to amend or modify existing operating and construction permits on a case by case basis upon request of the installation. This policy affects each offset lithographic printing facility in Missouri, unless 10 CSR 10-2.340, *Control of Emissions from Lithographic Printing Installations* applies.

The following approaches are to be used to calculate emissions for EIQs and PTE.

Calculation of Potential to Emit and Actual Emissions for Heatset Offset Lithographic Printing Operations

An installation may assume 20% retention of ink solvents for heatset offset lithographic printers. A mass balance approach should be used to calculate PTE from printing operations, assuming 80% of the Volatile Organic Compound (VOC) in the inks is emitted to the ambient air. When preparing EIQs, actual emissions fees need to be paid for that 80% portion that is assumed to volatilize at the installation. A source that desires to claim a greater retention factor than that provided for in this policy may conduct a test approved by the Air Pollution Control Program to determine the exact VOC retention percentage. If test results are used, they must be documented and submitted with the annual EIQ.

Calculation of Potential to Emit and Actual Emissions for Non-Heatset Offset Lithographic Printing Operations

For purposes of determining actual emissions, an installation may assume 95% retention of ink solvents for non-heatset offset lithographic printers. Emission fees need to be paid only for the 5% portion that is assumed to volatilize at the installation. A mass balance approach should be used to calculate PTE from printing operations, assuming 5% of the VOC in the inks is emitted to the ambient air. As an alternative to the 95% retention factor, a source may conduct testing approved by the Air Pollution Control Program to determine the exact amount of ink solvent retained in the substrate. If the results of this test are used, it must be documented and submitted with the annual EIQ.